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ABSTRACT

Physician employment needs in Ohio were reviewed, with attention to supply and demand, medical school enrollments, and attendant costs. The major focus was to develop an information system and methodology that would support planning for medical school education. Specific concerns were: (1) whether physician production in Ohio's medical schools and residency programs are meeting the need for physicians in the State; (2) whether the decline in the 18- to 22-year-old population will affect the number of qualified in-state applicants; (3) whether there is evidence that a continued large output of physicians will resolve the state's maldistribution of primary care physicians, and (4) whether the overproduction of physicians increases or decreases health care cost. Data were obtained on the number of licensed physicians living in Ohio, arrayed by age, practice specialty, county, and for selected counties, by zip codes. Primary care physician-to-population ratios were used to assess the presence of underserved counties. The numbers of physicians needed in Ohio by 1990 and 2000 were projected. To assess current and future physician supply, calculations were made of medical school enrollments, residencies, and in-migration of foreign and out-of-state physicians. The cost of medical education and the cost of physician oversupply were also assessed. (SW)

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OHIO BOARD OF REGENTS

3600 State Office Tower
30 East Broad Street
Columbus, Ohio 43215

Telephone: (614) 466-6000

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REPORT ON PHYSICIAN MANPOWER IN OHIO: REQUIREMENTS, SUPPLY AND COST

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July 15, 1983

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PREFACE

Ohio has one of the most comprehensive and accessible medical education systems in the United States. This system includes seven medical colleges--six allopathic and one osteopathic; four colleges associated with public universities, one with a private university and two free-standing public medical colleges. These institutions are geographically well distributed among Ohio's major population centers. Their programs and missions are diverse and show a breadth of capabilities. Further, the medical colleges and their associated clinical facilities are a vital part of the communities they serve, not just as providers of physician training and health services but as major employers and economic contributors, as multimillion dollar research and development centers and as educational providers for other health care professionals and technical personnel.

The Board of Regents recognizes the very important role of the medical colleges to the health of Ohio's citizens as well as to Ohio's economy. At the same time, the Board of Regents has statutory responsibility for assessing the changing needs of higher education as a whole and for making recommendations for adjustments in program and funding priorities consistent with those needs. It was with this objective that the Board nearly two years ago directed a review of Ohio's health manpower needs including physician supply and demand, medical school enrollments and attendent costs. The major focus of this effort has been to develop an information system and methodology to, on a continuing basis, assess the productivity of Ohio's seven medical schools in

light of current and projected physician manpower needs. The eventual outcome of such a systematic review should suggest necessary changes over time, through an orderly and constructive process, to medical school enrollments, and number and mix of residencies.

A study of physician manpower in Ohio is particularly critical now. Any maldistribution remaining in selected counties needs to be identified and remedies suggested. At the same time, escalating health care and medical education costs are making increasing demands upon the state's limited educational funding. And since it takes from seven to nine years to train a physician, any alterations in the medical education system put into effect today to correct shortages or unwanted surpluses would not likely impact on physician levels in the state until after 1990.

This report on physician manpower and medical education requirements specifically addresses the following questions:

1) Is physician production by Ohio's medical schools and residency programs meeting the need for physicians by the state's medical care system?

2) Will the decline in the 18 to 22 year old population group result in an in-state applicant pool that lacks sufficient numbers and quality to support the current entry class size of 895 Ohio resident positions?

3) What is the evidence that a continued large output of physicians will resolve the state's maldistribution of primary care physicians?

4) Will an overproduction of physicians increase or decrease society's health care costs?

To develop relevant data on these issues, the Board of Regents has drawn from current State Medical Board records on practicing physicians and its own information system on medical school enrollments and associated costs. Supplemental information from several national studies has been incorporated, especially as related to determining acceptable physician levels to service community health needs. Analysis and extension of these data to future populations provide the mechanism for physician manpower planning.

The concern for physician need and production levels is not unique to Ohio. Two national studies have suggested the United States will be producing more physicians than needed by 1990. In the study conducted by the Graduate Medical Education National Advisory Committee (GMENAC), this excess is estimated to be 70,000,[1] while the Health Resources Administration's Bureau of Health Professions projects a surplus but not the magnitude of the GMENAC study.[2] Recently, the Southern Regional Education Board published a monograph on need for health professionals in the southern states and found that the production of the health educational programs far exceeds need.[3] At least eight other states are reviewing physician manpower needs and reassessing medical school enrollments including the neighboring states of Michigan, Wisconsin and Illinois.

BACKGROUND

In 1970, it was believed that unless a concerted action was taken immediately to increase physician production, Ohio would soon have a marked shortage of physicians for the state's anticipated population. Further, this shortfall of physicians, projected to be mainly in the primary care disciplines, would be accompanied by a worsening of the then geographic maldistribution of physicians.

In 1972, consultants were retained to advise the Board of Regents on strategies for resolving this anticipated crisis in physician manpower.[4,5] In their reports, the consultants recommended residency expansion and improvement of quality, as well as a significant increase in class size at the four established medical schools as ways to solve the manpower problems. No strong case was made for additional medical schools at that time, though there was support for studying the possibility of one school in the northeast region of the state.

By 1980, the medical schools at the University of Cincinnati, The Ohio State University, Case Western Reserve University, and Medical College of Ohio at Toledo were well into their planned expansion of class size to aggregate admissions of 750 students per year by 1980. Case Western Reserve University had in 1969 entered into a contract with the Ohio Board of Regents to admit 60% of its entering class from the Ohio resident applicant pool.

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In 1973 and 1974, new allopathic medical schools were authorized by the General Assembly at Wright State University in Dayton, and Northeastern Ohio Universities College of Medicine in Rootstown; and in 1975, the osteopathic medical school at Ohio University was authorized. Many of the first graduates of these schools are still in residency training, though a number of recently graduated osteopaths have completed their internships and are now in practice. The General Assembly also authorized at that time special funding to enhance and expand primary care and family practice residencies so as to achieve better retention and distribution of physicians across Ohio.

The impact of these state initiatives directed at the expansion of medical school enrollments and physician manpower are shown in Table 1.

TABLE 1

PHYSICIAN MANPOWER STATUS

	1970	1983
Medical School Output		
Schools	4	7
Graduates	337	896
Entering Class	462	1,025
Total Enrollment	1,580	3,629
Internships and Residency		
Internships --		
Total Positions	943	NA
Filled Positions	634	NA
Residency --		
Total Positions	2,549	NA
Filled Positions	2,109	3,625
Practicing Physicians	10,197	17,662*
Primary Care	4,703	6,108
Medical Specialty	601	1,879
Surgical Specialty	3,010	4,935
Other	1,883	4,740
Ohio Population	10,688,000	10,791,000

* Includes house officers with a license; 2500 temporary licenses to medical residents are not included.

Data Sources: Ohio Department of Development, Ohio Board of Regents, Ohio Department of Health, Ohio Medical License Board

The comparison of 1970 to 1983 data shows that total enrollments and total graduates from the medical schools have more than doubled. The number of filled residency positions has increased over 30%, and the number of licensed physicians has increased over 40%, while the population of the state has increased less than 0.1%/year.

The combination of a marked expansion in physician production and retention to practice with almost an unchanged population base appears to have averted the crisis in physician manpower anticipated in 1970. However, since the population increases assumed in expanding medical enrollments never materialized, and since the evidence which follows points to an overall surplus, the state should determine at an early date whether the existing system is consistent with current and future needs. To assist in making this determination the following physician manpower study has been developed.

PHYSICIAN MANPOWER

Methodology

The determination of future physician need in Ohio requires first an accounting of current manpower levels. The State Medical Board earlier this year provided to the Regents data collected during a fall 1982 triennial reregistration of all physicians

holding valid Ohio licenses. Using specialty codes and practice sites addresses, the Regents were able to obtain the number of licensed physicians living in Ohio, arrayed by age, practice specialty, county, and for selected counties, by zip codes.

Eight medical specialities have been employed in this study as identified by the State Medical Board: General/Family Practice, Pediatrics, Internal Medicine-General, Internal Medicine-Special, Obstetrics/Gynecology (OB/GYN), Surgery and Surgical Disciplines, Psychiatry, and Other. The "Other" category includes all remaining physicians, the majority being specialists in pathology, radiology, emergency medicine, rehabilitation medicine and public health.

State and county current and forecasted population data were obtained from the Department of Development. Historical data on physicians' practice and primary care shortages were obtained from the Ohio Department of Health.

The definition of primary care is that used in the Health Professions Educational Association Act of 1976 (PL 94-484) and includes the specialties of General/Family Practice, Pediatrics, and General Internal Medicine-General.[2] There are some, however, who advocate including Obstetrics/Gynecology as a primary care specialty. That specialty is included only in an alternative analysis (Appendix M-4).

In this study, primary care physician-to-population ratios have been used to assess the presence of underserved counties of

the state. These ratios have been used by the Bureau of Health Professions to identify Health Manpower Shortage Areas (HMSA's). This designation qualifies counties for placement of National Health Service Corps physicians and sets eligibility for federal assistance programs to attract physicians to underserved areas.[2] According to these guidelines, the minimally acceptable ratio for primary care physician-to-population is 1:3500, though specific consideration is also given to such factors as the incidence of poverty, infant mortality, and over-utilized provider capacity. Thus, small catchment areas can be identified within larger political units that may have additional physician manpower needs while the general area is adequately supplied. A ratio of 1:2500 is frequently employed as a planning standard and has been used in countries with a nationalized health care system. Both ratios have been employed in this study to provide the broadest assessment of shortage or surplus.

A survey of office visit data was made to determine the reasonableness of the proposed 1:3500 or 1:2500 ratios for ambulatory care services. In 1981, data from the National Health Inventory Survey showed that there were 703,416,000 office visits to physicians, or 3.12 visits per person per year. Of this total, 65.8% or 2.06 visits per person per year were to primary care physicians in their offices.[6] In parallel data from the National Ambulatory Care Survey, total visits were estimated to be 575,745,000, or 1.67 visits per person per year to a primary care physician.[7]

Visit times were calculated in the surveys to be between 15.9 to 17 minutes per person per visit.[8] If 46.9 weeks is the national norm assumed to be the work year,[8] then a primary care physician caring for 2500 people would spend just over 31 hours per week in the office seeing patients. At a ratio of 1:3500, the physician would need to see patients for 43.5 hours per week. The average general practice physician in a non-metropolitan area spent 35.7 hours seeing ambulatory patients.[9] Thus, it appears that although either planning ratio is possible the 1:2500 ratio is more realistic and provides a more than adequate guideline for projecting future need/demand.

Current Needs

Appendix M-1 provides the data on Ohio physicians by specialty and county of practice. Only one county has no physician living in it, while 11 counties have less than 10 physicians each, but populations of less than 33,000. In the aggregate, there are 6,108 primary care physicians giving the state a physician-to-population ratio of 1:1780, considerably higher than either generally acceptable standard of 1:2500 or 1:3500.

An age distribution of physicians was determined by specialty and county (see Appendices M-2 and M-3). This data shows that 22.6% of the physicians are 35 years or less and 11.6% are 65 years or older, with an average age of 47 years for the total

group. The greatest concentration of the 65 and older group are found in Family Practice where they represent 18% of the practicing physicians.

A survey of 200 physicians 65 years or older determined 64% are in their office 20 or more hours weekly, 45% still admit patients to the hospital, and 63% carry malpractice insurance (see Appendix M-4). These data would certainly suggest that this cohort is still providing a significant amount of health care.

To determine whether there are counties with a primary care physician maldistribution, each county's population and complement of physicians was compared against ratios that varied from 1:3500 to a very high 1:2000. As Appendix M-5 indicates, at a ratio of 1:3500, there are 17 counties needing a total of 40 physicians. At a ratio of 1:2500, there are 52 counties needing 260 physicians. There is still a maldistribution problem in the state, but at a ratio of 1:2500, a 40% increase over 1:3500, only 260 additional physicians would be needed. This assumes that all physicians practice full-time. However, physicians over 65 years of age, as a group, have been shown to practice about half time. Since there are 323 physicians in the 52 counties with a primary care shortage (Appendix M-6), 160 additional physicians would be needed if all over 65 years of age are in a primary care discipline. For purposes of this analysis then, Ohio would need 420 primary care physicians to meet the current shortage. When OB-GYN specialists and internist-specialists with secondary codes of primary care are added to the physicians in Appendix M-3,

probably a more accurate picture of the patient care services is obtained for each county (see Appendix M-7). At a ratio of 1:2500, the state's deficit of primary care physicians without consideration of age is 101 or 261 if assuming those over age 65 are practicing on the average half time.

Still another way to approach the calculation of physician need in Ohio was used by Dr. Walter McClure, President of the Center for Policy Studies and a consultant to this study (See Appendix M-8). He recommends an active physician-to-population ratio of 1.5/1000 with the mix of specialties established by the market place. Using this method of assessment, Ohio has a total physician-to-population ratio of 1.62/1000 and an active physician ratio of 1.40/1000. He concludes Ohio has a quite adequate supply of physicians at present.

Future Needs

There are a variety of ways to calculate the number of physicians that must be in practice in Ohio by 1990 and the year 2000 to meet service needs. One approach would be to impanel a group of experts who in their professional judgment define the state's anticipated need for physicians as was done in the national GMENAC study.

Another approach would be to examine the demand for physician services of a given population and project that demand for the desired years. Such demand calculations involve consideration of population dynamics, illness occurrence, impact of health

interventions, social policy on eligibility for and access to care, and the physicians' practice patterns. One simple solution to the demand calculation that has been used as a substitute for the more detailed approach is a physician-to-population ratio. However, using physician population ratios assumes a future demand for services and a practice pattern not too dissimilar from the current circumstances. As will be discussed later, any demographic shift in the state's population characteristics must be accounted for in any future projections.

In developing a projection, there are a number of calculations that must be made. First, there must be an accounting for the number of physicians who retire, leave practice or die. To determine that number per year, an age, sex and specialty-specific separation rate is multiplied against the current physician population. In this report, the separation rate published in the national GMENAC study was used.[1] For the current physician population in Ohio this means a total of 334 physicians will need to be replaced and as shown on Table 2, 116 of them are in primary care and 218 in non-primary care practices.

TABLE 2

ANNUAL PHYSICIAN REPLACEMENT REQUIREMENTS*

Total number of physicians required		334
Primary Care physicians		116
Family Practice	61	
Pediatrics	19	
Internal Medicine	36	
Non-Primary Care		218

*Using GMENAC separation rate

Because of the almost flat population growth of Ohio, most of this need is as replacement of physicians in practice. In these calculations, the assumption is made that mortality and retirement rates will not change. To assess the sensitivity of the GMENAC retirement rate on the calculations of replacement, the rate was increased by 20% for all physicians over age 50 and no appreciable change was found in the replacement needs. Little change occurs because the average age of the physicians is 47 years.

Next, as the population increases, primary care and specialty care physicians must be added based upon some assumption of need. In this study, primary care physicians are added at a rate to sustain a 1:2500 ratio and the non-primary care physicians at a rate to maintain the state's current ratio of 1:1000.

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TABLE 3
NEEDS PROJECTION

	1983 Current	1983-1985	1985-1990	1990-1995	1995-2000	1983-2000 Total
Population Projection	10,828,026	10,848,290	10,941,502	11,078,133	11,224,798	
Population		20,264	93,212	136,631	146,665	396,772
Rate of Change Per Year		10,132	18,642	27,326	29,333	22,043
Physicians Needed						
Replacement		680	1,701	1,803	1,858	6,202
Additions for Growth	420					
1:2500 Primary Care		8	37	55	59	
1:1000		20	93	137	147	
Total	420	28	120	192	206	806
Total New Physicians for Replacement and Growth	420	708	1,821	1,995	2,064	7,008
Number of New Physicians Needed per Year		354	364	399	413	390

Table 3 shows the results of such a projection. A total of 7,008 physicians would be needed over the next 17 years to maintain the physician-to-population ratio of 1:2500 in primary care and 1:1000 in non-primary care. This calculation also includes the 420 primary care physicians earlier identified as needed to solve the current maldistribution problem.

Thus, once the maldistribution of primary care physicians is achieved, adding approximately 390 new physicians a year of the appropriate mix of specialties is suggested as a replacement figure that will keep Ohio in reasonable balance. This estimate represents a moderate position rather than either an upper or lower limit.

Sources of Supply

Several sources of physicians must be considered in assessing current and future supply. These include: medical school enrollments, residencies and in-migration of foreign and out-of-state physicians.

Ohio's seven medical schools currently have an aggregate entry class size of 1,025 students and an Ohio resident class size of 895. Though there are 1,400 - 1,600 individuals in the initial in-state applicant pool, only 1,085 Ohio residents completed the multi-stage application process this past year, with approximately 250 being reapplications from students rejected for admission in prior years. Case Western Reserve University draws approximately 60% of its entering class from Ohio while the University of Cincinnati and Ohio University draw 80% of their entry classes from Ohio residents. In recent years, the other state-supported medical schools have begun to take out-of-state students but in small numbers. Recent population projections by age cohorts show the beginning of a significant decline in the number of individuals in the 18-22 age group which will continue for some period of time. Though the medical schools are admitting older students, the 18-22 age group still contains the vast majority of applicants.

Table 4 shows the expected enrollments and numbers of graduates from the state's seven medical schools over the next five years. At current production levels Ohio will be producing more than 1,000 medical graduates annually by 1985. Current

attrition rates are less than 5% and some schools have filled those openings with transfers from other schools. The time from entering medical school until entry into practice is generally seven to nine years, with certain surgical subspecialties requiring three to five additional years.

TABLE 4

ENROLLMENTS & GRADUATES

	FY 1983		FY 1984		FY 1985		FY 1986	
	Fall Headct. Enroll.	Grads.	Fall Headct. Enroll.	Grads.	Fall Headct. Enroll.	Grads.	Fall Headct. Enroll.	Grads.
Ohio State University	831	127*	942	251*	932	237	920	241
University of Cincinnati	763	189	768	192	768	192	768	192
Case Western Reserve Univ.	601	165	593	154	588	158	578	151
Medical College of Ohio at Toledo	474	30*	602	120*	632	150	632	150
Wright State University	395	98	396	87	410	105	405	105
Ohio University	289	45	339	70	367	71	393	96
Northeastern Ohio Univ. Coll. of Med.	350	71	386	80	411	96	420	105
TOTAL	3703	725	4026	954	4108	1009	4116	1040

*Short Term fluctuations caused by change in curriculum from 3 to 4 years.

Approximately 56% of the 1982 classes remained in Ohio for residency training. Appendix M-9 provides data on the residency specialty areas of medical school graduates by school for the last several years. The three new schools of medicine at Ohio University, Wright State University and Northeastern Ohio Universities College of Medicine were authorized with the stated mission of training primary care physicians using community-owned clinical

facilities. Though there have been only three graduating classes to date, Wright State has the highest percentage of graduates who pursue primary care residencies. Ohio University would appear to have more graduates enter primary care practice because of the high percentage who only take a one-year internship.

A residency inventory conducted each year by the Board of Regents shows by specialty the number of new physicians participating in internships and residencies as well as those ready to enter practice (Table 5). In family practice, there were 96 residents and 93 osteopathic interns available to enter practice in 1981. A total of 1,329 practicing physicians, 748 in primary care, were available from this source, approximately 70% of which established practices in Ohio.

TABLE 5

RESIDENCY DATA: 1980-1981

	1st Year Residents	Total Residents	Available to Enter Practice[a]
Primary Care			
Pediatrics	103	277	153
Internal Medicine	212	754	406
Family Practice	220(b)	445(b)	189(b)
OB/GYN	47	212	56
Psychiatry	30	178	66
General Surgery and Surgical Specialties	138	912	354
Other Specialties(d)	112	445	105

(a) 3rd and 4th year + Senior Fellows
(b) Includes 116 Osteopathic Interns
(c) All 3rd year Residents + 93 Osteopathic Interns
(d) Pathology, Radiology, Physician Medicine, Emergency Medicine, etc.

On Table 6 are the data and calculations for determining the migration of physicians to and from Ohio. Presently Ohio is a net importer of physicians with the foreign trained physicians accounting for a sizeable percentage of the licenses granted to out-of-state applicants. A large number of the physicians leaving Ohio are residents who hold permanent licenses, have finished training and are establishing practices in some other state. For the two years studied, the number of new licenses granted to Ohio-trained physicians did slightly exceed the loss of physicians due to death and retirement.

Of the 730 foreign medical school graduates who received initial licenses to practice medicine in Ohio, 624 received licenses through reciprocity agreements (endorsement method) with other states and 106 through examination as applicants from Ohio.

TABLE 6

AVERAGE ANNUAL RATES OF CHANGE
LICENSED OHIO PHYSICIANS
AVERAGE OF 1981 & 1982 CHANGES

Increase:	Total	From Ohio Med. Schools	Migration to Ohio
Osteopathic	169	34	135
M.D. - U.S. Medical Schools	1011	443	568
- Foreign Medical Schools	365	-	365
- Not Known	10	-	10
	1375	477	1098

Decreases	Total	Retirement, License Suspension Death Other	Endorsement to Another State, Establishment of Practice in Another State
Osteopathic	48	18	30
M.D.	816	443	373
	864	461	403

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Average Annual increase in the number of licensed Ohio physicians.

Projected Supply

Appendix M-10 presents the results of a simple simulation projection of the number of graduates of the undergraduate medical education system and the state residency programs if no changes were made in the present system, with a general population growth of 0.1% per year. A 56% historical retention rate is assumed for physician graduates obtaining Ohio residencies and a 70% retention rate is assumed for residency trainees establishing Ohio practices. The results forecasts of physician supply by specialty for the same time period are provided in Table 7.

TABLE 7

OHIO PHYSICIAN SUPPLY FORECAST
(Assuming no change in current production system)

	Family Practice	Pediatrics	Int. Med.	OB	Surgery	Psychiatry	Other	Total Physi.	Population	Pri.Care/ Popu.Ratio
1980	3359	914	3395	952	3476	763	3381	16,241	10,797,639	1:1408
1990	3850	1483	5510	1283	4490	995	4498	22,109	10,941,502	1:902
2000	4591	2022	7523	1597	5392	1207	5457	27,789	11,224,798	1:703

In summary, the Ohio residencies will provide, using the 70% historical retention rate, over 900 physicians a year for practice in Ohio. Though there is a dip in graduates in 1983, the medical schools will be graduating 1,000 physicians a year starting in 1985, and from then on, the output of the medical schools and residencies will be constant at that level, so that in seven years, over 6,000 Ohio trained physicians will be available to

establish practice in the state. Assuming an eight-year training period for a physician, any changes in medical school entry class size in 1984 would have no effect before 1992.

Cost of Medical Education

In 1973-74, studies on the costs of medical education were published by the Institute of Medicine and the Association of American Medical Colleges (AAMC). No systematic accounting base study has been performed since that time, so for purposes of this study, data from a 1975 AAMC cost survey were projected using inflationary factors from each time period.[10] A sample of those calculations provided in Table 8 provides an annual cost estimate for 1993 of over $40,000 per full-time-equivalent (FTE) student.

TABLE 8

COST OF MEDICAL EDUCATION

Average Total Cost per FTE Student (1975 AAMC Study)	= $24,647
Inflation adjustment CPI 1983/CPI 1975	= 1.780
Rolled forward average cost ($24,647 X 1.78)	= $43,872

In the AAMC study, approximately 55% of the medical schools' funds were derived from state subsidies, tuition and endowment, while 45% came from restricted funds such as research and practice plan income. Income generation from non-teaching sources reflect

the multiple outputs of today's medical schools. It is this diversity of outputs that makes assigning costs specifically to separate outputs all but impossible.

Comparable data specific to Ohio's medical schools are not readily accessible. However, selected information on state subsidies in other states is provided in Appendix M-11. Appendices M-12 and M-13 show the aggregate and individual medical school subsidies for instruction and clinical teaching in Ohio for the 1982-83 biennium.

Funds from the state in the form of subsidies are directed toward support of the educational process. For example, if $43,000 is assumed to be the total cost on an FTE student basis, then Ohio funds 53% of the total cost which is comparable to the 55% found for state funding tuition and endowment income in the AAMC study.

Cost of Physician Oversupply

Strong, quality medical education programs are found in institutions that also have highly desired residency and fellowship training programs and well-organized basic and clinical science research endeavors. Funding for one area may also significantly support another such as research supporting education. For those reasons, total funding rather than funding based on undergraduate enrollment would more accurately reflect

the needs of these programs. Adequate funding of seven medical schools at their current size will require more funds than are currently available.

It has been shown that the total cost to educate a medical student is about $43,000 per year or approximately $160,000 per graduate. In 1983, Ohio contributed in direct subsidies $22,750/FTE or 53% of the total cost per year. Conservatively, if no inflation or capital costs are assumed, Ohio taxpayers will spend in direct subsidies $91,000 per graduate.

Using the data in Table 3 for the year 1985, the number of physicians needed will be 364 while 1,009 students are expected to graduate. Though there is a three to five year lag between graduation and entry into practice, from 1985 on the number needed and the number graduated are relatively constant in respect to each other. If oversupply is defined as graduates in excess of physicians needed, then there would appear to be approximately 600 physicians per year in excess. Thus, the cost of such an oversupply annually would be $91,000 X 600 = $54.6 million. With the resource requirements for quality programming not sufficient in the total system, then a restructuring of the funding to outputs would appear to be essential.

Conclusions - Need, Supply, Cost

First, the aggregate number of medical students and physician graduates of the seven Ohio medical schools is projected to exceed need by more than a factor of two. Yet there remain shortages of primary care physicians in selected counties, rural communities, and inner-city urban areas, which even the National Health Service Corps program has not been able to staff successfully. Large numbers of medical school graduates will not guarantee any graduates will establish practices in the underserved areas. Rather a state-supported initiative to specifically place physicians in the underserved areas would be considerably more cost effective than the continued non-focused strategy of overproduction. Ohio must take action since it is highly probable that the National Health Service Corps will cease to exist in the near future.

A number of initiatives were taken by the General Assembly during the 1970's to remedy the maldistribution problem. Programs in family practice and primary care have received line funding from the state in an effort to build high quality undergraduate and residency programs. Ohio now has 30 family medicine residency programs that received $1,780,200 in 1983 to specifically support residency training. In 1982, 81 physicians finished their family medicine training and established practice in Ohio. For reasons that are not clear, a number of trainees choose to leave Ohio rather than practice in one of those Ohio communities intensively

trying to attract a physician. This loss of well-trained family medicine physicians is of great concern, since this group can best meet the health care needs of medically underserved areas of the state. As was shown earlier, a large number of family physicians will be needed to replace those reaching retirement.

Family practice training programs must be continued to support state goals for placing physicians in underserved areas. As a method of easing this maldistribution, the state should continue to support strong family practice activities in medical education and residency training. The state should also continue to support the statewide Area Health Education Centers (AHEC), a consortium of the seven medical schools that provides significant portions of a medical student's clinical experiences in rural or inner-city patient care sites. In addition, the AHEC program provides continuing education experiences for the practitioners in less populated areas, helping to remove one of the serious impediments to practicing medicine in professionally isolated areas.

In projecting the need due to maldistribution at 420 primary care physicians, it is recognized that for certain counties, the population is on one side of a county or state line and the physicians on the other side. Also, there are physicians, who in relicensing, indicated they were non-primary care specialists, but actually spend the vast majority of their time as primary care physicians. Thus, these projections could suggest a greater need than is actually present.

In Ohio, as well as nationally, the number of individuals 65 and older is increasing significantly and their demand for medical care will require more physician time. At the same time, at the other end of the age spectrum, the numbers of children are declining. The net difference in this shift is about a 5-7% increase in demand for services; and for family physicians, this can be a direct substitution for unneeded pediatric service time.

It is recognized that greater percentages of graduates from medical school are women and some suggest they may have a lesser participation rate and work fewer hours during a particular period of their lives than their male counterparts. However, even if this is true, because of their greater longevity than men, their effective practice period could more than offset this variation. Further study of this factor and its impact may be advisable in future efforts to quantify supply.

In the aggregate, no adjustments have been made to the calculation of shortage of 420 physicians except for the less-than-full time work load of physicians over age 65. There are counter balancing events as well as excess primary care services in the metropolitan areas which could shift to the underserved areas. Also, there are at least 2,000 primary care physicians who will be finishing training over the next six years who can fill those needed positions.

It is possible to aggregate some of the additions and subtractions to the current physician manpower and give a worst-case calculation. Starting with a shortage of 260 primary care

physicians (irrespective of age), 862 primary care physicians 65 years or older could decide to retire increasing the current need to 1,122. However, neither has any correction been made in the supply calculation by adding in the more than 1000 physicians coming into Ohio annually to practice from other states or countries which would offset those potential retirements. If, in another worst-case circumstance, all foreign-trained physicians discontinued migration to Ohio, approximately 365 physicians finishing training would have to be retained to offset that loss. Approximately that number currently leave Ohio when they finish residency training, so that loss could be compensated as well.

Secondly, the cost to Ohio to graduate a physician is at least $90,000 in education expenses, but when indirect costs such as capital are included, the total exceeds $100,000. The annual cost to the state of the continued overproduction (estimated at 600 physicians/year) is nearly $55 million. At a time of limited state resources and a consequent weakening of program quality, the Board of Regents suggests there is an urgent need to review the projected need for physicians among the state's priorities. In the case of medical education, this would mean enhancing funding per student and the quality of education for reduced enrollment levels.

In the conduct of patient care, each physician generates health care costs that must be paid by society, either through funding of third party benefits or public supported programs.

There is considerable evidence that community-based medical costs are correlated to the number and type of physicians available with increasing costs found where there are abundant specialists.[11] Also, the style of practice impacts on the use of resources from a very conservative approach to elaborate use with both approaches providing similar patient outcomes.[12] In both studies, the local accepted standard of practice as established by the physicians has a very large effect on total costs.

Having too many physicians can be costly to society especially if the excesses are in surgical specialties with elaborate styles. These issues have not been examined as part of this study, but are clearly operative as the explanation of the significant differences in costs within and between communities in Ohio.

RECOMMENDATIONS

This report clearly identifies two problems that require action:

1) There are well-defined underserved areas of the state due to maldistribution of primary care physicians; and
2) The supply of new physician graduates in Ohio is projected to greatly exceed the number of physicians needed for replacement and population growth as defined by traditional parameters.

However, before any recommendations are made, two common misconceptions should be clarified. One popular assumption is that grossly increasing the numbers of physicians will remedy the chronic shortages in selected communities. The second is that health care costs will go down as numbers of physicians increase. Neither assumption is correct.

Despite the substantial increase in physician production since 1970, substantial shortages still do exist in selected communities. And as indicated earlier, there will likely be a few communities in the state which will continue to have difficulty attracting adequate health care professionals. Special strategies involving creative incentives need to be developed to remedy these selected shortfalls. Simply producing more physicians will not wholly solve the problem and further, any gains made in this manner are highly cost ineffective. Further, the overproduction solution suggests that all of these physicians will stay in Ohio; they will not. Rather, they will locate their practices in states which are not overproducing physicians.

Similarly, escalating health care costs have not been shown to be halted by producing more physicians so long as the system of third party payers continues. Usual supply and demand relationships have not operated in medical care in the past. The supplier dominates in all transactions and the price is generally not known to the patient since a third party pays the cost. As

physicians' services become more accessible, more persons seek medical attention, without consideration of cost, driving up Medicaid and other insurance costs which eventually take their toll on the user and the state.

Assumptions

The examination of alternative strategies for solving the problems of maldistribution and oversupply must be based upon certain assumptions as follows:

1) Ohio does not have sufficient financial resources to fund educational costs for unneeded physicians or physicians for other states.

2) A state supports the education of physicians
   - to help assure an adequate supply of physicians for the state's needs
   - to help assure that physicians are available to provide for the particular health needs of rural and inner-city populations
   - to offer opportunities for its citizens who want to pursue careers in medicine.

3) With an overabundance of available physicians, a state may incur both the additional costs of medical school education and experience increased medical care expenditures for a defined population.

4) The citizens of Ohio prefer Ohio-educated physicians to fill medical care needs rather than a continued influx of foreign-trained physicians.

5) Resolution of both the maldistribution and oversupply problems requires an integration of physician production, residency training capacity and medical licensing policy.

6) State funds will be available to medical students to assure that a broad cross section of Ohio's population can pursue a medical education.

7) Any resolution of the total medical student enrollment should not be a strategy for cost savings, but rather a mechanism to fund a high quality medical education system.

8) The state has responsibility to assure access to high quality health care for all its citizens regardless of geographic location or socio-economic status.

Further, the examination of alternative strategies for resolving maldistribution and oversupply rests only partially with the Regents. As is their responsibility, the Regents have documented the problem and focused public and legislative attention on the issue. However, they have coordinating authority over only one portion of the total problem and therefore cannot solve the problem alone. A number of other segments of government and society who have a role in establishing and implementing broad social policy in this regard must agree on an appropriate strategy to meet physician manpower needs in Ohio before any implementation can be effected.

Strategy for Resolving Physician Maldistribution

There are a significant number of physicians in training that have incurred educational debt as shown in Appendix M-14, the distribution of individual debts from a state medical school. Primary care physicians (family practice, general internal medicine and pediatrics) generally do not generate an income stream that allows debt replacement without a marked impact on life style. An individual with $40,000 educational debt at 14% interest will pay back $7,800 a year for 15 years, or a total of $117,000.

Among the various proposals which have been suggested for solving the maldistribution problem is the recruitment of primary care physicians to the highest priority underserved areas and institutions through appropriate financial inducements. One such recruitment tool might be the cancelling of education debt for service in an identified shortage area. As an example, service for each year in a locale might remove $10,000 worth of debt. Terms of service should be correlated with the aesthetic and cultural attractiveness of the community or site of practice. As shown in Appendix M-15, a sliding scale for these communities could be developed.

Another important element in the recruitment of a physician to a given community is mutual selection by the community and by the physician. It is assumed that a community that wants and selects a physician, as well as guarantees his/her income, has a high likelihood of retaining that individual after the term of the contract. Hopefully, the physician picks the community for the same reasons.

Since most of the communities in the underserved areas have offered guaranteed salaries, this could be continued, but the billing for professional service should become the responsibility of a state-level organizing unit so as to assure the community that their investment is protected. Efficient practice management is also essential in this type of arrangement which, again, a state-level organization could oversee.

To provide a cost analysis for such a proposal, the debt distribution in Appendix M-14 could be assumed with 100 high priority practice sites. The estimated total cost per year for the incentive portion of the operational costs as shown in Appendix M-15 would then approximate $1 million. Other costs would, of course, depend on the scope of activities of the proposed state-level administering unit in establishing or monitoring these practices.

Strategy for Resolving Physician Oversupply

A careful analysis of physician needs for the State of Ohio, using traditional parameters, strongly indicates the potential of a sizable overproduction of physicians by the early 1990's. Further, a sizable number of foreign and out-of-state physicians being licensed to practice in Ohio will add to that surplus.

Clearly, neither the General Assembly nor the medical education system has any desire to alter the current output of more than 1000 physicians a year until there is greater certainty on the continued influx of foreign-trained physicians, output of established residencies, resolution of the underserved areas and better understanding of how federal policy changes on medical care will impact manpower needs.

A similar caution is suggested by individual citizens who have experienced frustration in attaining ready access to physician services -- long lead times for appointments, long waits

in doctors offices, etc. Such waits may well be due to lack of effective scheduling but to the patient they are perceived as shortages. Not surprisingly, any suggestion of a cutback is strongly opposed.

These factors support the premise that any solution to the problem of a surplus of physicians is not vested solely with the educational institutions or the Board of Regents. There are many components of society which are vitally concerned about and affected by any suggestion of change in physician production. Other components have a role in the funding or the establishing of standards of quality relating to physician manpower.

It is for these reasons that the Regents recommend the establishment or designation of an unit in state government for the purpose of:

(1) Developing a comprehensive data base relating to physician manpower needs, expanding the currently available information sources to more specifically identify geographic and socio-economic access problems;

(2) Based upon these data, establishing state policy with reference to physician manpower needs and monitoring the physician population consistent with this policy;

(3) Recommending changes in medical school admission, distribution, licensing and residencies to comport with state policy and priorities; and

(4) Assisting underserved communities or institutions with locating physicians and developing incentive programs for the attraction and retention of physicians as suggested in the earlier section on maldistribution.

Such an office should have a broad base of representation which should include representatives of the General Assembly, the state government, including the Department of Health, the Ohio Board of Regents, and the State Medical Board, medical educators, practicing physicians, business and labor and appropriate citizens groups. Through this vehicle is it hoped that Ohio may assure delivery of quality health care to all of its citizens both in the near future as well as on a continuing long-term basis.

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LICENSED PHYSICIANS PRACTICING IN OHIO
AS OF FEBRUARY 23, 1983

	FAM PRAC	PEDS	IM-G	IM-SP	OB-GYN	SURG	PSY	OTHER	TOTAL
ADAMS	4	1	1	1	1	1	0	3	13
ALLEN	41	8	10	14	6	43	0	31	153
ASHLAND	17	3	4	2	3	14	0	2	49
ASHTABULA	25	4	7	2	0	23	1	15	66
ATHENS	14	4	2	4	3	11	1	16	57
AUGLAIZE	15	0	0	1	2	6	0	3	27
BELMONT	27	3	7	2	4	9	3	26	79
BROWN	8	1	1	1	2	3	0	3	19
BUTLER	49	14	24	19	19	64	8	35	234
CARROLL	3	0	0	0	2	0	0	2	11
CHAMPAIGN	11	0	3	1	0	4	0	3	24
CLARK	37	9	27	14	13	44	5	28	177
CLERMONT	18	0	3	1	1	3	0	4	37
CLINTON	14	0	2	1	1	4	0	0	32
COLUMBIANA	32	4	10	9	3	21	0	13	94
COSHOCTON	3	0	3	1	1	2	0	4	24
CRAWFORD	18	0	1	1	1	15	0	7	44
CUYAHOGA	379	241	524	565	2[illegible]	949	237	970	4[illegible]
DARKE	15	1	3	2	1	6	1	5	33
DEFIANCE	9	1	3	1	1	8	1	3	42
DELAWARE	13	1	3	4	2	10	1	14	54
ERIE	24	4	13	8	3	17	1	28	124
FAIRFIELD	30	4	5	5	3	16	1	11	76
FAYETTE	9	1	1	0	1	4	0	1	16
FRANKLIN	301	135	203	231	110	423	113	619	2[illegible]
FULTON	14	0	1	0	1	3	0	1	20
GALLIA	4	5	9	4	4	14	1	6	57
GEAUGA	19	3	3	2	4	15	1	17	74
GREENE	41	10	11	3	7	15	2	34	124
GUERNSEY	12	2	3	3	2	8	4	7	47
HAMILTON	251	178	307	288	139	498	170	497	2[illegible]
HANCOCK	9	2	12	9	5	25	1	12	75
HARDIN	7	0	4	1	0	4	0	3	19
HARRISON	6	0	0	0	0	2	0	1	9
HENRY	4	0	0	0	1	1	0	1	8
HIGHLAND	8	1	4	3	2	6	0	4	28
HOCKING	8	1	0	0	0	2	0	1	13
HOLMES	13	0	0	0	0	2	0	0	15
HURON	27	1	1	1	2	11	0	4	51
JACKSON	6	0	4	0	0	1	0	1	12
JEFFERSON	21	3	11	11	9	29	2	11	102
KNOX	13	1	7	2	2	7	0	7	42
LAKE	46	12	15	21	13	44	9	31	195
LAWRENCE	9	1	2	2	2	6	0	2	24
LICKING	15	4	5	7	4	25	3	17	92
LOGAN	11	3	3	2	0	6	0	1	46
LORAIN	44	14	23	25	15	68	6	12	277
LUCAS	192	55	81	127	42	259	54	27	1[illegible]
MADISON	12	1	2	1	2	3	2	3	26
MAHONING	68	21	73	62	29	104	18	119	516
MARION	12	9	14	14	2	16	1	17	110
MEDINA	18	4	8	9	4	27	1	12	97
MEIGS	0	0	0	0	0	1	0	3	11
MERCER	10	1	2	1	1	4	0	4	28
MIAMI	28	4	9	3	3	15	2	14	84

	FAM PRAC	PEDS	IM-G	IM-SP	OB-GYN	SURG	PSY	OTHER	TOTAL
MONROE	3	0	0	0	0	0	0	1	4
MONTGOMERY	254	64	110	127	64	263	85	33	1264
MORGAN	2	0	0	0	0	0	0	1	3
MORROW	6	0	0	0	0	0	0	0	6
MUSKINGUM	19	0	0	1	0	3	0	1	104
NOBLE	3	0	0	0	0	0	0	0	4
OTTAWA	15	1	1	0	1	3	0	4	26
PAULDING	2	0	0	0	0	1	0	0	3
PERRY	4	0	0	0	0	0	0	1	5
PICKAWAY	16	0	2	0	1	5	0	1	29
PIKE	9	0	2	0	0	1	0	0	14
PORTAGE	20	4	7	3	0	2	0	7	94
PREBLE	11	0	0	0	0	1	0	1	14
PUTNAM	0	0	0	0	0	0	0	0	0
RICHLAND	24	5	21	10	4	4	0	2	1[illegible]
ROSS	11	0	1	1	1	2	0	1	26
SANDUSKY	12	1	2	1	1	2	0	5	55
SCIOTO	11	1	2	1	0	5	0	2	89
SENECA	14	1	2	1	1	5	0	2	59
SHELBY	12	1	0	1	0	6	0	4	37
STARK	108	21	61	59	31	120	18	15	564
SUMMIT	176	49	85	87	51	221	35	25	969
TRUMBULL	68	9	31	18	16	65	8	7	364
TUSCARAWAS	24	1	4	4	0	20	3	1	73
UNION	3	0	0	1	0	3	0	1	14
VAN WERT	0	0	1	0	0	3	0	1	11
VINTON	0	0	0	0	0	0	0	0	0
WARREN	27	3	3	1	1	5	0	1	51
WASHINGTON	24	2	7	1	1	10	0	1	61
WAYNE	11	4	11	1	1	10	0	1	94
WILLIAMS	14	1	0	1	1	9	0	1	31
WOOD	11	4	5	4	3	14	2	1	85
WYANDOT	5	0	0	0	0	2	0	2	9
TOTAL	3172	1003	1933	1879	1030	3897	833	3907	17662

SOURCE: OHIO STATE MEDICAL LICENSE BOARD COMPUTER FILE

APPENDIX M-1

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DISTRIBUTION OF OHIO PHYSICIANS BY AGE

Age	30	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Number	1337	2692	2546	2257	1850	1841	1831	1439
Percent	7.6	15.2	14.4	12.8	10.5	10.4	10.4	8.1

Age	65-69	70-74	75-79	80
Number	904	600	313	52
Percent	5.1	3.4	1.8	0.3

DISTRIBUTION OF PHYSICIANS 65 YEARS AND OLDER BY SPECIALTY

	Fam.P.	Peds	IM-G	IM-SP	OB/GYN	SURG	PSYCH	OTHER
Number	585	69	208	177	85	433	66	247
Percent of total in specialty	18.4	6.8	10.8	9.4	8.2	11.1	7.9	6.3

RESULTS OF SURVEY TO PHYSICIANS OVER 65 YEARS OF AGE

1) Distribution of Respondents N = 180/200 90%

	65-67	68-70	71-73	74-76	77-79	80>
%	20.5	25.6	18.2	12.0	10.7	12

2) Practice Activity:

Active	67%
Retired	31.8%
Deceased	1.2%

3) If active, hours in office doing patient care:

40 or more	7.3%
30 - 40	20.2
20 - 30	36.7
10 - 20	24.8
< 10	11.0

4) Admitting privileges to hospital:

Admitting patients - 67.3%

No privileges - 32.7%

5) Admitted a patient to hospital in last month:

Yes	45.3%
No	54.7%

6) Maintain malpractice insurance:

Yes	62.5%
No	37.5%

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MEDINA	122879	97	40	3071	0.0	0.0	41.0	-1.0	49.2	-9.2	61.4	-21.4
MEIGS	24885	13	4	3110	0.0	0.0	8.3	-0.3	10.0	-2.0	12.4	-4.4
MERCER	39280	28	13	3021	0.0	0.0	13.1	-0.1	15.7	-2.7	19.6	-6.6
MIAMI	91974	84	43	2138	0.0	0.0	0.0	0.0	0.0	0.0	46.0	-3.0
MONROE	18027	4	3	6009	5.2	-2.2	6.0	-3.0	7.2	-4.2	9.0	-6.0
MONTGOMERY	559297	1264	430	1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MORGAN	14922	5	4	3730	4.3	-0.3	5.0	-1.0	6.0	-2.0	7.5	-3.5
MORROW	28017	9	6	4669	8.0	-2.0	9.3	-3.3	11.2	-5.2	14.0	-8.0
MUSKINGUM	85189	104	35	2433	0.0	0.0	0.0	0.0	0.0	0.0	42.6	-7.6
NOBLE	11656	4	3	3885	3.3	-0.3	3.9	-0.9	4.7	-1.7	5.8	-2.8
OTTAWA	40892	26	17	2405	0.0	0.0	0.0	0.0	0.0	0.0	20.4	-3.4
PAULDING	22000	9	7	3142	0.0	0.0	7.3	-0.3	8.8	-1.8	11.0	-4.0
PERRY	32343	9	7	4620	9.2	-2.2	10.8	-3.8	12.9	-5.9	16.2	-9.2
PICKAWAY	44502	29	18	2472	0.0	0.0	0.0	0.0	0.0	0.0	22.3	-4.3
PIKE	23797	18	11	2163	0.0	0.0	0.0	0.0	0.0	0.0	11.9	-0.9
PORTAGE	139491	91	40	3487	0.0	0.0	46.5	-6.5	55.8	-15.8	69.7	-29.7
PREBLE	39421	14	11	3583	11.3	-0.3	13.1	-2.1	15.8	-4.8	19.7	-8.7
PUTNAM	33591	9	9	3732	9.6	-0.6	11.2	-2.2	13.4	-4.4	16.8	-7.8
RICHLAND	130968	149	51	2568	0.0	0.0	0.0	0.0	52.4	-1.4	65.5	-14.5
ROSS	65886	76	32	2058	0.0	0.0	0.0	0.0	0.0	0.0	32.9	-0.9
SANDUSKY	63969	55	25	2558	0.0	0.0	0.0	0.0	25.6	-0.6	32.0	-7.0
SCIOTO	86766	89	29	2991	0.0	0.0	0.0	0.0	34.7	-5.7	43.4	-14.4
SENECA	62490	59	25	2499	0.0	0.0	0.0	0.0	0.0	0.0	31.2	-6.2
SHELBY	44776	27	13	3444	0.0	0.0	14.9	-1.9	17.9	-4.9	22.4	-9.4
STARK	379765	566	194	1957	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUMMIT	514218	969	314	1637	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRUMBLE	243570	264	100	2435	0.0	0.0	0.0	0.0	0.0	0.0	121.8	-21.8
TUSCARAWAS	86074	73	29	2995	0.0	0.0	0.0	0.0	34.7	-5.7	43.4	-14.4
UNION	31307	16	9	3478	0.0	0.0	10.4	-1.4	12.5	-3.5	15.7	-6.7
VAN WERT	30992	21	11	2817	0.0	0.0	0.0	0.0	12.4	-1.4	15.5	-4.5
VINTON	12332	0	0	12332	3.5	-3.5	4.1	-4.1	4.9	-4.9	6.2	-6.2
WARREN	103160	51	33	3126	0.0	0.0	34.4	-1.4	41.3	-8.3	51.6	-18.6
WASHINGTON	66753	61	33	2022	0.0	0.0	0.0	0.0	0.0	0.0	33.4	-0.4
WAYNE	100742	94	47	2143	0.0	0.0	0.0	0.0	0.0	0.0	50.4	-3.4
WILLIAMS	37162	33	19	1955	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WOOD	112632	85	40	2815	0.0	0.0	0.0	0.0	45.1	-5.1	56.3	-16.3
WYANDOT	22902	9	5	4580	6.5	-1.5	7.6	-2.6	9.2	-4.2	11.5	-6.5
TOTAL	10815640	17662	6108			-39.8		-83.4		-259.7		-685.9

FOOTNOTE:

Conservative Assumptions:

Population: Forecast 1983, derived from Ohio Department of Development's Population Forecast. Same publication of OBOR forecast, the U.S. Census has released estimates of Ohio's population which show that migration was understated and Ohio's population is actually decreasing.

Primary Care Physicians: The following categories are not included in the count of Primary Care physicians.

- Obstetricians are included in federal primary care manpower calculations, but not considered primary care in this analysis.
- Specialists who provide primary care.
- Physicians without designated specialties.

DISTRIBUTION OF PHYSICIANS, BY COUNTY, IN FEBRUARY, 1983.
USING VARIOUS DEFINITIONS OF "NEED" FOR PRIMARY CARE PHYSICIANS.
N= POPULATION DIVIDED BY STANDARD
NEEDED = PHYSICIANS CURRENTLY IN PRACTICE MINUS N.

	POPULATION	PHYS TOTAL	PRIM CARE N	PRIM CARE RATIO	3500 N	3500 STANDARD NEEDED	3000 N	3000 STANDARD NEEDED	2500 N	2500 STANDARD NEEDED	2000 N	2000 STANDARD NEEDED
ADAMS	25982	13	7	3711	7.4	-0.4	8.7	-1.7	10.4	-3.4	13.0	-6.0
ALLEN	112755	162	58	1944	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASHLAND	47173	49	24	1965	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASHTABULA	105802	86	36	2938	0.0	0.0	0.0	0.0	42.3	-6.3	52.9	-16.9
ATHENS	57953	77	40	1448	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AUGLAIZE	43800	27	15	2920	0.0	0.0	0.0	0.0	17.5	-2.5	21.9	-6.9
BELMONT	83515	79	36	2319	0.0	0.0	0.0	0.0	0.0	0.0	41.8	-5.8
BROWN	33605	19	10	3360	0.0	0.0	11.2	-1.2	13.4	-3.4	16.8	-6.8
BUTLER	268396	216	89	3015	0.0	0.0	89.5	-0.5	107.4	-18.4	134.2	-45.2
CARROLL	26812	11	7	3830	7.7	-0.7	8.9	-1.9	10.7	-3.7	13.4	-6.4
CHAMPAIGN	34657	24	16	2166	0.0	0.0	0.0	0.0	0.0	0.0	17.3	-1.3
CLARK	147512	173	73	2020	0.0	0.0	0.0	0.0	0.0	0.0	73.8	-0.8
CLERMONT	139295	37	27	5159	39.8	-12.8	46.4	-19.4	55.7	-28.7	69.6	-42.6
CLINTON	35574	32	16	2223	0.0	0.0	0.0	0.0	0.0	0.0	17.8	-1.8
COLUMBIANA	115140	96	46	2503	0.0	0.0	0.0	0.0	46.1	-0.1	57.6	-11.6
COSHOCTON	36864	24	10	3686	10.5	-0.5	12.3	-2.3	14.7	-4.7	18.4	-8.4
CRAWFORD	49661	44	19	2613	0.0	0.0	0.0	0.0	19.9	-0.9	24.8	-5.8
CUYAHOGA	1427658	4181	1239	1152	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DARKE	56948	33	19	2997	0.0	0.0	0.0	0.0	22.8	-3.8	28.5	-9.5
DEFIANCE	41146	42	19	2165	0.0	0.0	0.0	0.0	0.0	0.0	20.6	-1.6
DELAWARE	57402	56	21	2733	0.0	0.0	0.0	0.0	23.0	-2.0	28.7	-7.7
ERIE	80687	126	41	1967	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FAIRFIELD	99931	76	39	2562	0.0	0.0	0.0	0.0	40.0	-1.0	50.0	-11.0
FAYETTE	28044	19	11	2549	0.0	0.0	8.8	0.0	11.2	-0.2	14.0	-3.0
FRANKLIN	876893	2043	633	1385	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FULTON	39278	20	15	2618	0.0	0.0	0.0	0.0	15.7	-0.7	19.6	-4.6
GALLIA	31676	57	20	1583	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GEAUGA	77841	70	25	3113	0.0	0.0	25.9	-0.9	31.1	-6.1	38.9	-13.9
GREENE	130694	124	62	2107	0.0	0.0	0.0	0.0	0.0	0.0	65.3	-3.3
GUERNSEY	43762	47	17	2574	0.0	0.0	0.0	0.0	17.5	-0.5	21.9	-4.9
HAMILTON	854979	2295	716	1194	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HANCOCK	65438	75	23	2845	0.0	0.0	0.0	0.0	26.2	-3.2	32.7	-9.7
HARDIN	33143	19	11	3013	0.0	0.0	11.0	0.0	13.3	-2.3	16.6	-5.6
HARRISON	18532	9	5	3706	5.3	-0.3	6.2	-1.2	7.4	-2.4	9.3	-4.3
HENRY	28725	8	4	7181	8.2	-4.2	9.6	-5.6	11.5	-7.5	14.4	-10.4
HIGHLAND	34490	28	14	2492	0.0	0.0	0.0	0.0	0.0	0.0	17.4	-3.4
HOCKING	25425	13	9	2825	0.0	0.0	0.0	0.0	10.2	-1.2	12.7	-3.7
HOLMES	31504	14	12	2625	0.0	0.0	0.0	0.0	12.6	-0.6	15.8	-3.8
HURON	56156	51	29	1936	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JACKSON	31755	11	8	3969	9.1	-1.1	10.6	-2.6	12.7	-4.7	15.9	-7.9
JEFFERSON	89980	102	35	2570	0.0	0.0	0.0	0.0	36.0	-1.0	45.0	-10.0
KNOX	47501	42	21	2261	0.0	0.0	0.0	0.0	0.0	0.0	23.8	-2.8
LAKE	216795	195	73	2969	0.0	0.0	0.0	0.0	86.7	-13.7	108.4	-35.4
LAWRENCE	66222	28	12	5518	18.9	-6.9	22.1	-10.1	26.5	-14.5	33.1	-21.1
LICKING	124858	97	44	2837	0.0	0.0	0.0	0.0	49.9	-5.9	62.4	-18.4
LOGAN	40446	48	27	1498	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LORAIN	280224	277	101	2774	0.0	0.0	0.0	0.0	112.1	-11.1	140.1	-39.1
LUCAS	467972	1161	328	1426	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MADISON	34237	26	15	2282	0.0	0.0	0.0	0.0	0.0	0.0	17.1	-2.1
MAHONING	284499	516	182	1563	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MARION	68808	110	35	1965	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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NUMBER OF PHYSICIANS 65 YEARS OR OLDER IN COUNTIES WITH PRIMARY CARE SHORTAGES

Counties		65-69	70	Total
17	1:3500	8	17	25
52	1:2500	145	178	323

DISTRIBUTION OF PRIMARY CARE PHYSICIANS BY COUNTY

** INCLUSIVE DEFINITION OF PRIMARY CARE, INCLUDING OB-GYN, PHYSICIANS WHO ENTERED PRIMARY CARE SPECIALTIES AS SECOND OR THIRD PRACTICE SPECIALTY, AS WELL AS THOSE RECOGINZED IN EARLIER APPENDIX.

	POPULATION	PHYS TOTAL	PRIM CARE N	PRIM CARE RATIO	3500 N	3500 STANDARD NEEDED	3000 N	3000 STANDARD NEEDED	2500 N	2500 STANDARD NEEDED	2000 N	2000 STANDARD NEEDED
ADAMS	25982	13	9	2886	0.0	0.0	0.0	0.0	10.4	-1.4	13.0	-4.0
ALLEN	112755	162	74	1523	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASHLAND	47173	49	32	1474	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASHTABULA	105802	86	49	2159	0.0	0.0	0.0	0.0	0.0	0.0	52.9	-3.9
ATHENS	57953	77	51	1136	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AUGLAIZE	43800	27	19	2305	0.0	0.0	0.0	0.0	0.0	0.0	21.9	-2.9
BELMONT	83515	79	46	1815	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BROWN	33605	19	15	2240	0.0	0.0	0.0	0.0	0.0	0.0	16.8	-1.8
BUTLER	268396	236	120	2236	0.0	0.0	0.0	0.0	0.0	0.0	134.2	-14.2
CARROLL	26812	11	10	2681	0.0	0.0	0.0	0.0	10.7	-0.7	13.4	-3.4
CHAMPAIGN	34657	24	17	2038	0.0	0.0	0.0	0.0	0.0	0.0	17.3	-0.3
CLARK	147512	173	93	1586	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLERMONT	139295	37	30	4643	39.8	-9.8	46.4	-16.4	55.7	-25.7	69.6	-39.6
CLINTON	35574	32	20	1778	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COLUMBIANA	115140	96	64	1799	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COSHOCTON	36864	24	11	3351	0.0	0.0	12.3	-1.3	14.7	-3.7	18.4	-7.4
CRAWFORD	49661	44	28	1773	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CUYAHOGA	1427658	4181	1902	750	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DARKE	56948	33	22	2588	0.0	0.0	0.0	0.0	22.8	-0.8	28.5	-6.5
DEFIANCE	41146	42	25	1645	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DELAWARE	57402	56	26	2207	0.0	0.0	0.0	0.0	0.0	0.0	28.7	-2.7
ERIE	80687	126	58	1391	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FAIRFIELD	99931	76	45	2220	0.0	0.0	0.0	0.0	0.0	0.0	50.0	-5.0
FAYETTE	28044	19	14	2003	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0
FRANKLIN	876893	2043	931	941	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FULTON	39278	20	16	2454	0.0	0.0	0.0	0.0	0.0	0.0	19.6	-3.6
GALLIA	31676	57	34	931	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GEAUGA	77841	70	36	2162	0.0	0.0	0.0	0.0	0.0	0.0	38.9	-2.9
GREENE	130694	124	76	1719	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GUERNSEY	43762	47	23	1902	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HAMILTON	854979	2295	1110	770	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HANCOCK	65438	75	40	1635	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HARDIN	33143	19	14	2367	0.0	0.0	0.0	0.0	0.0	0.0	16.5	-2.6
HARRISON	18532	9	5	3706	5.3	-0.3	6.2	-1.2	7.4	-2.4	9.3	-4.3
HENRY	28725	8	7	4103	8.2	-1.2	9.6	-2.6	11.5	-4.5	14.4	-7.4
HIGHLAND	34890	28	22	1585	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOCKING	25425	13	9	2825	0.0	0.0	0.0	0.0	10.2	-1.2	12.7	-3.7
HOLMES	31504	14	12	2625	0.0	0.0	0.0	0.0	12.6	-0.6	15.8	-3.8
HURON	56156	51	33	1701	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JACKSON	31755	11	8	3969	9.1	-1.1	10.6	-2.6	12.7	-4.7	15.9	-7.9
JEFFERSON	89980	102	54	1666	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
KNOX	47501	42	29	1637	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAKE	216795	195	105	2064	0.0	0.0	0.0	0.0	0.0	0.0	108.4	-3.4
LAWRENCE	66222	28	18	3679	18.9	-0.9	22.1	-4.1	26.5	-8.5	33.1	-15.1
LICKING	124858	97	58	2152	0.0	0.0	0.0	0.0	0.0	0.0	62.4	-4.4
LOGAN	40446	48	31	1304	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LORAIN	280224	277	147	1906	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUCAS	467972	1101	507	923	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MADISON	34237	26	18	1902	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAHONING	284499	516	254	1120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MARION	68808	110	53	1298	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MEDINA	122879	97	59	2082	0.0	0.0	0.0	0.0	0.0	0.0	61.4	-2.4
MEIGS	24885	13	10	2488	0.0	0.0	0.0	0.0	0.0	0.0	12.4	-2.4

MERCER	39280	28	16	2455	0.0	0.0	0.0	0.0	0.0	0.0	19.6	-3.6
MIAMI	91974	84	57	1613	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MONROE	18027	4	3	6009	5.2	-2.2	6.0	-3.0	7.2	-4.2	9.0	-6.0
MONTGOMERY	559297	1264	618	905	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MORGAN	14922	5	4	3730	4.3	-0.3	5.0	-1.0	6.0	-2.0	7.5	-3.5
MORROW	28017	9	6	4669	8.0	-2.0	9.3	-3.3	11.2	-5.2	14.0	-8.0
MUSKINGUM	85189	104	54	1577	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOBLE	11656	4	4	2914	0.0	0.0	0.0	0.0	4.7	-0.7	5.8	-1.8
OTTAWA	40892	26	21	1947	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAULDING	22000	9	8	2750	0.0	0.0	0.0	0.0	8.8	-0.8	11.0	-3.0
PERRY	32343	9	7	4620	9.2	-2.2	10.8	-3.8	12.9	-5.9	16.2	-9.2
PICKAWAY	44502	29	20	2225	0.0	0.0	0.0	0.0	0.0	0.0	22.3	-2.3
PIKE	23797	18	12	1983	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PORTAGE	139491	91	51	2735	0.0	0.0	0.0	0.0	55.8	-4.8	69.7	-18.7
PREBLE	39421	14	12	3285	0.0	0.0	13.1	-1.1	15.8	-3.8	19.7	-7.7
PUTNAM	33591	9	9	3732	9.6	-0.6	11.2	-2.2	13.4	-4.4	16.8	-7.8
RICHLAND	130968	149	74	1769	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROSS	65886	76	45	1464	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SANDUSKY	63969	55	33	1938	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SCIOTO	86766	89	39	2224	0.0	0.0	0.0	0.0	0.0	0.0	43.4	-4.4
SENECA	62490	59	35	1785	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SHELBY	44776	27	16	2798	0.0	0.0	0.0	0.0	17.9	-1.9	22.4	-6.4
STARK	379765	566	301	1261	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUMMIT	514218	969	439	1171	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRUMBLE	243570	264	134	1817	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TUSCARAWAS	86874	73	40	2171	0.0	0.0	0.0	0.0	0.0	0.0	43.4	-3.4
UNION	31307	16	10	3130	0.0	0.0	10.4	-0.4	12.5	-2.5	15.7	-5.7
VAN WERT	30992	21	12	2582	0.0	0.0	0.0	0.0	12.4	-0.4	15.5	-3.5
VINTON	12332	0	0	12332	3.5	-3.5	4.1	-4.1	4.9	-4.9	6.2	-6.2
WARREN	103160	51	38	2714	0.0	0.0	0.0	0.0	41.3	-3.3	51.6	-13.6
WASHINGTON	66753	61	40	1668	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WAYNE	100742	94	62	1624	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WILLIAMS	37162	33	26	1429	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WOOD	112632	85	50	2252	0.0	0.0	0.0	0.0	0.0	0.0	56.3	-6.3
WYANDOT	22902	9	7	3271	0.0	0.0	7.6	-0.6	9.2	-2.2	11.5	-4.5
TOTAL	10815640	17662	8802			-24.1		-47.8		-101.2		-281.2

Center for Policy Studies / 2221 University Ave. S.E. / Minneapolis, MN 55414 / 612-623-4652

Walter McClure, Ph.D.

June 1, 1983

Thomas A. Helmrath, MD
Vice Chancellor for Health Affairs
Ohio Board of Regents
3600 State Office Tower
30 East Broad Street
Columbus, OH 43215

Dear Dr. Helmrath,

You asked me to comment on the Ohio Board of Regents "Preliminary Report on Physician Manpower in Ohio" dated April 15, 1983. I feel qualified to comment only on the manpower projections for new physicians, not on how Ohio might restructure medical education and residencies to accomplish its desired manpower goals. In general I find the reports' conclusion, to reduce Ohio's physician graduating class to 500 new physicians per year, quite reasonable to meet Ohio's expected physician requirements to the year 2000.

My conclusions are based on the following points. Currently in 1983 Ohio has 17,662 active licensed physicians according to the State Medical Board. I estimate 92% of these are in patient care (as opposed to non-patient-care activities such as administration, teaching, and research) for a ratio of 1.50 patient-care physicians per 1000 persons in Ohio. Studies of efficient physician practice suggest that a representative typical American population can be quite adequately served by 1.3 to 1.5 full-time patient-care physicians per 1000 persons, provided that the physicians practice efficient conservative practice styles, maintain full patient loads, and are well-distributed by location and specialty. With these caveats, Ohio has a quite adequate physician stock at present.

If Ohio physicians are not in the areas and specialties needed, or maintain less than full loads, or practice inefficient styles, then special programs and incentives should be designed to redistribute them and to encourage efficient practice. Strategies to compensate for physician maldistribution and inefficiency by increasing the physician stock have proven costly and ineffective.

If Ohio continues to graduate 1025 new physicians per year from its medical schools and to complete 894 residencies per year from its teaching hospitals, then under current rates of physician retention, immigration, and retirement, I estimate (see technical note attached) Ohio will have 1.90 patient-care physicians per 1000 persons by 1990 and 2.43 by the year 2000. These ratios are high, and appear excessive by reasonable standards of physician need and efficiency.

If on the other hand Ohio were to follow the Regents Report recommendation to

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reduce the graduating class of Ohio medical schools to 500 new physicians per year, then even under the extreme assumptions that this could be done immediately and that no graduates of out-of-state medical schools would take residencies in Ohio, the Ohio physician-to-population ratio would still rise to 1.65 patient-care physicians per 1000 persons by 1990, and to 1.83 in the year 2000. These ratios are more than adequate to meet Ohio's physician needs by reasonable standards of need and efficiency. Since the reduction in class size will actually take at least three to four years to accomplish, and since out-of-state graduates will in fact still seek Ohio residency programs, the actual ratios will be higher than these by at least 10% or more.

I must therefore conclude that the Regents Report recommendation is more than reasonable. It may even be too generous. If not a single new medical graduate or resident entered patient care in the next seven years in Ohio, the net growth in the Ohio physician stock, simply from immigration exceeding emigration and retirement, would still raise the physician-to-population ratio to 1.53 patient-care physicians per 1000 persons by 1990. This is still quite adequate. Of course I do not recommend that Ohio discontinue all medical education, since it is important to quality patient care in Ohio that Ohio maintain adequate on-going medical education and teaching programs. I simply point it out to underscore the reasonableness of the Regents Report recommendation on reducing the aggregate Ohio medical graduating class size to 500. It also underscores that even were the current Ohio rates of physician retention, immigration, and retirement to worsen significantly, the Regents Report recommendation to set the medical school graduating class at 500 new physicians per year would still more than adequately meet Ohio's physician needs in the future.

I hope these remarks prove helpful in your deliberations. If you have questions or comments, please contact me.

Sincerely,

Walter McClure, Ph.D.
president

WM:bf

Enc.

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Technical Note: The number of patient-care physicians (N) at t years in the future can be projected as:

$$N_t = N_o + T \times P \times (R + I - D)$$

where N_o = the number of patient-care physicians in the base year of 1983

T = the percentage of licensed physicians in patient care

R = the number of physicians entering practice after completing an Ohio residency program per year

I = the net physician immigration per year and

D = the number of physicians retiring or dying

The percentage of licensed physicians in patient care is estimated from the AMA master file for Ohio because the State Medical Board maintains a file only on total active licensed physicians without regard to their patient-care or non-patient-care status. This percentage is P = 92%.

The number of patient-care physicians in 1983 is estimated by applying P to the State Medical Board file of 17,662 licensed Ohio physicians, or N_o = 92% x 17,662 = 16,250 patient-care physicians.

The number of physicians completing Ohio residencies per year is currently 894, of which currently 70% remain in Ohio and enter practice; these numbers are taken from the Regents Report. Hence R = .70 x 894 = 626.

The net physician immigration to Ohio is currently reported by the Regents Report as 400 physicians per year, being the difference of 1300 in-migrants vs. 900 out-migrants. Hence I = 400.

The number of Ohio physicians currently lost to retirement and death is 305 to 330 physicians per year according to the Regents Report. Hence D = 320.

The estimation of the patient-care physician stock in 1990 is given by:

$$\begin{aligned} N(1990) &= N_o + T \times P \times (R + I - D) \\ &= 16,250 + 7 \times .92 \times (626 + 400 - 320) \\ &= 20,796 \text{ patient-care physicians} \end{aligned}$$

Dividing by the projected 1990 population of 10,942,000 gives 1.90 patient-care physicians per 1000 persons in 1990. A similar calculation yields 27,292 patient-care physicians in 2000 A.D., and dividing by the projected population of 11,225,000 yields 2.43 patient-care physicians per 1000 persons in 2000 A.D. Note that these are patient-care physicians, not total physicians as reported in the Regents Report. (Total physicians in 1990 would be 17,662 + 7 x (626 + 400 - 320) = 22,604 or 2.06 licensed physicians per 1000 persons, in agreement with the Regents Report, table 7.)

The estimation for the Regents Report recommendation assumes a medical graduating class of 500. It further assumes that only 56% of these graduates will go on to complete an Ohio residency, as at present. It further assumes that only 70% of those completing Ohio residencies will enter practice in Ohio, as at present. It further assumes that no graduates of out-or-state medical schools will complete an Ohio residency. Hence R = 500 x .56 x .70 = 196. Repeating the above calculations with this new value of R yields 1.65 patient-care physicians per 1000 persons in 1990 and 1.83 in the year 2000. These are

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extremely conservative assumptions. First the graduating class can not be cut instantaneously; only the entering class can be cut. Second, if the class is cut, the number of in-state and out-of-state graduates going on to residencies will probably increase, because teaching hospitals will more actively recruit them. Hence actual physician to population ratios will be even higher.

The estimate for no new medical graduates is obtained by setting R = 0, so that the entire physician increase comes soley from I and D. Repeating the above calculations with R = 0 yields 1.53 patient-care physicians per 1000 persons in 1990 and 1.56 in the year 2000. As above, this extreme low estimate is too conservative and is solely to illustrate the safety of the Regents Report recommendation.

PERCENT OF MEDICAL SCHOOL GRADUATES CHOOSING FAMILY PRACTICE, PEDIATRICS OR INTERNAL MEDICINE, GENERAL RESIDENCIES FOLLOWING GRADUATION

	1980	1981	1982
Case Western Reserve University	53	59	49
University of Cincinnati	55	55	48
Medical College of Ohio at Toledo	53	52	45
Northeastern Ohio Universities College of Medicine	-	43	31
Ohio State University	49	55	56
Wright State University	68	52	63
Ohio University * College of Osteopathic Medicine	100	100	100
System	54	54.8	44.9

* All osteopathic physicians enter general internships following graduation. Subsequent specialization may occur in later years.

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SURVEY OF STATE FUNDING OF MEDICAL EDUCATION

State	Year of Data	FTE Students	Appropriation for Med.Schools	Total State Appropriation*
Texas	1980			
U.T.		3367	$ 41,585/FTE	$ 312,465,217
A & M		96		
Louisiana	1981			
L.S.U. - NO		730	39,796,390	72,861,244
L.S.U. - SH		507	14,033,045	
Illinois	1981			
U of I		1372	44,300,000	99,100,000
S/U		220	21,100,000	
Mississippi	1981	596	16,774,777	28,667,794
Georgia	1980			
Medical College		736	28,614,200	47,975,434
Michigan	1982			
M.S.U.		432	13,000,000	
West Virginia	1982			
U.V.W.		344	14,000,000	
Marshall		156	3,063,000	26,210,000
Osteopathic		237	3,380,000	
Ohio	1982	3600	60,894,709	82,306,709

*include Teaching Hospital

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UNDERSERVED AREA INCENTIVE PROGRAM
COSTS OF LOAN RETIREMENT PROGRAM

1. Base loan program on debt level at graduation from medical school of $24,165
Mean accumulated indebtedness, all U.S. medical school graduates, June 1982.

2. Assuming three years of residency at a compounding interest rate of 14% per year, the accumulated indebtedness would be $35,801
at the end of residency training.

3. Assume distribution of 100 physicians in underserved areas as follows:

Attractiveness of Community	Number	Years Required for Payback	Annual Individual Cost	Total Cost
A Acceptable	30	5	9,147*	274,427
B Marginal	55	4	10,778	592,797
C Severe	15	3	13,527	202,902
	100			1,070,126

* Five year annuity, annual payment first day of each year.

5/25/83
mjk

INDEBTEDNESS OF MEDICAL SCHOOL GRADUATES CLASS OF 1982

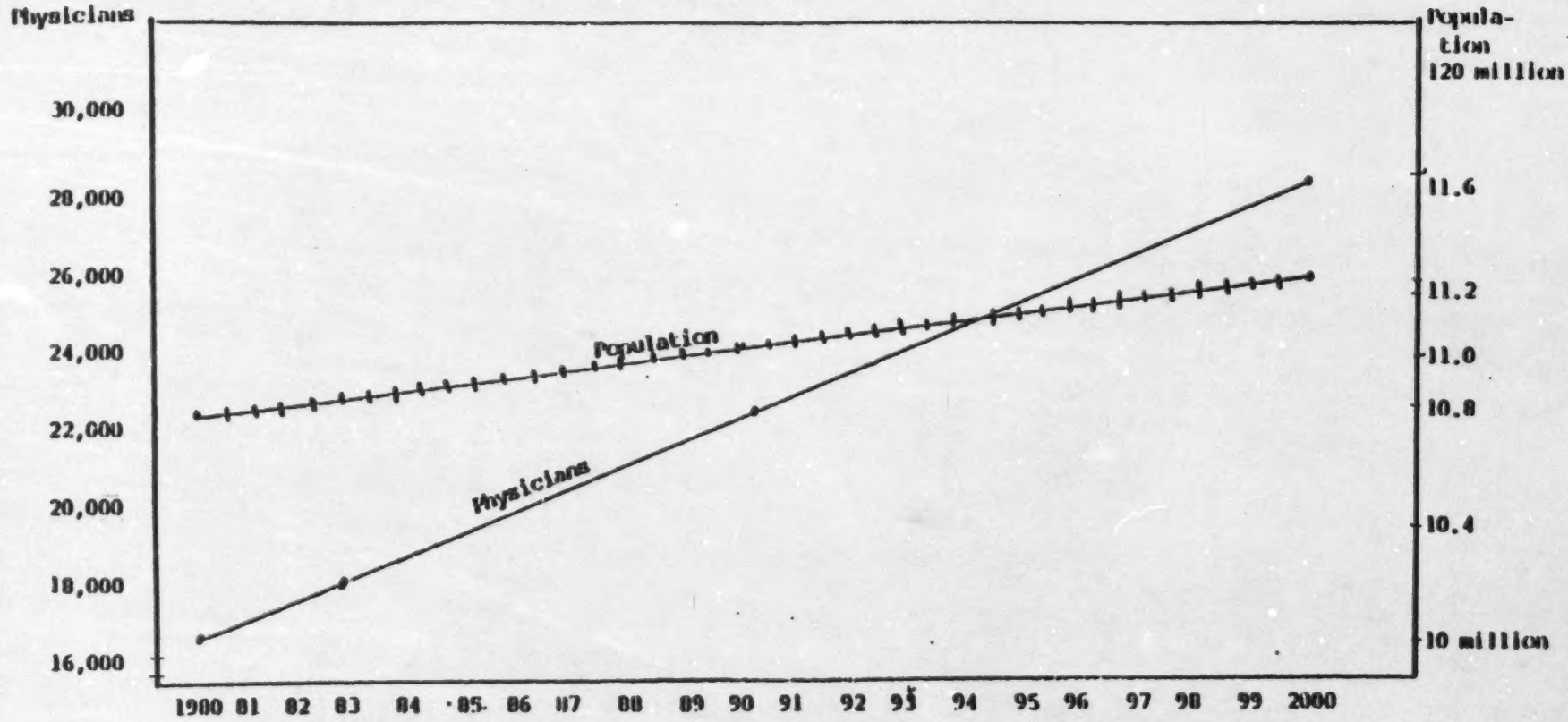
DATA FROM AN OHIO PUBLIC MEDICAL SCHOOL INTERNAL SURVEY

Range	Percent	Cumulative Percent
No debt	17.1	17.1
$1 - 4,999	5.2	22.3
5,000 - 9,999	9.1	31.4
10,000 - 14,999	9.7	41.1
15,000 - 19,999	23.9	65.0
20,000 - 24,999	17.9	82.9
25,000 - 29,999	6.0	88.9
30,000 - 50,000	10.4	99.3
> 50,000	.7	100.0
	100 %	

Average debt, this public medical school class = $17,983

Average debt, U.S. medical students = $24,165

SUPPLY PROJECTION



	1980	1983	1985	1990	1993	1995	2000
Population	10,797,630	10,828,026	10,848,290	10,941,502	11,019,467	11,078,133	11,224,798
Admissions	739	1,025	1,025	1,025	1,025	1,025	1,025
Graduations	736	725	1,000	1,000	1,000	1,000	1,000
Residents							
Licensed Physicians	16,241	17,662	18,982	22,089	23,870	25,022	27,726
Ratio Pop/Physicians	664	613	571	495	461	442	404

APPENDIX M-10

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STATE SUPPORT FOR MEDICAL SCHOOLS
FY 1982, FY 1983

	Instructional*	Clinical	Develop-mental	Family Practice	Primary Care	Geriatrics	Other Medical	Total
University of Cincinnati								
FY 1982	$ 9,177,092	$ 4,480,804	$	$580,165	$303,058	$136,227	$	$14,757,346
FY 1983	9,460,950	4,256,764		560,898	351,821	127,582		14,758,015
Medical College of Ohio								
FY 1982	6,599,912	3,793,818	3,050,932	771,348	370,090	136,227	330,750	15,053,077
FY 1983	6,901,011	3,604,128	2,308,500	682,046	337,166	130,547	299,250	14,263,448
No'eastern Ohio Universities								
FY 1982	3,122,025	295,407	2,419,200	828,013	363,678	136,227		7,164,550
FY 1983	3,853,599	280,456	3,614,085	781,170	327,094	129,469		8,986,053
Ohio University								
FY 1982	2,650,206	220,185	2,494,800	953,792	284,788	129,527		6,733,298
FY 1983	3,337,997	209,175	2,331,585	936,019	273,474	126,424		7,213,674
Ohio StateUniversity								
FY 1982	10,265,292	12,216,285		819,091	371,859	136,227		23,808,754
FY 1983	10,310,737	11,605,470		764,552	359,878	127,582		23,168,219
Wright State University								
FY 1982	4,207,183	405,599	2,494,800	815,101	343,795	136,227		8,402,605
FY 1983	4,664,256	385,225	2,331,585	775,084	352,793	129,469		8,638,412
Case Western Reserve Univ.								
FY 1982	4,768,553			643,560	502,228	136,227		6,050,568
FY 1983	4,530,125			639,944	407,052	129,469		5,706,590
FY 1982	40,790,263	21,411,998	10,459,732	5411,070	2620,296	946,889	330,750	81,970,998
FY 1983	43,058,675	20,341,398	10,585,755	5140,513	2489,278	899,542	299,250	82,814,411

* Does not include medical school portion of Civil Service Adjustment.

APPENDIX M-12

CLINICAL SUBSIDY DISTRIBUTION

ACTUAL

	1980	1981	1982	1983
University of Cincinnati	4,473,200	4,309,700	4,380,804	4,256,763
Medical College of Ohio	3,787,400	3,733,600	3,793,818	3,604,127
Northeastern Ohio Universities College of Medicine	212,000	290,700	295,407	280,636
Ohio University	177,600	216,700	200,185	209,175
Ohio State University	12,195,600	12,022,400	12,216,285	11,605,470
Wright State University	309,500	399,100	405,499	385,224
Total	21,464,800	21,072,200	21,411,998	20,341,400